

Remarks

In the Office Action of October 17, 2007, the Examiner rejected Claims 1 – 5, 8, 13 – 18, and 26 as being anticipated under §102(b) by Furcht (U.S. Patent No. 6,054,277); claim 26 as being anticipated under §102(b) by Thundat (U.S. Patent No. 6,289,717, or “Thundat ‘717”); and Claims 1 – 5, 7, 8, 13 – 18, and 21 – 25 as being anticipated under §102(e) by Welland (U.S. Patent Pub. No. 2003 0222232).

The Examiner also rejected Claims 1 – 8 and 12 - 25 as obvious under §103(a) over Thundat ‘717 in view of Thundat (U.S. Patent No. 6,016,686, or “Thundat ‘686”); Claims 1 – 8 and 12 - 25 as obvious under §103(a) over Thundat ‘717 in view of Thundat ‘686; Claims 9 and 10 as obvious under §103(a) over Welland in view of Negersmith (U.S. Patent No. 4,300,906); claim 11 as obvious under §103(a) over Furcht (U.S. Patent No. 6,054,277) in view of Polla (U.S. Patent No. 5,536,963); and Claims 27 - 32 as obvious under §103(a) over Welland in view of Paritsky (U.S. Publication No. 2003 0209656).

Applicants have cancelled claims 27-32 without prejudice and have provided discussion below for distinguishing the present claims, as amended, from the art cited against them.

35 USC §102(b)

The Examiner rejected Claims 1 – 5, 8, 13 – 18, and 26 as being anticipated under §102(b) by Furcht. Furcht discloses a genetic testing system that uses a cantilever to detect the binding of a specific analyte or specific DNA product to a molecular recognition surface. The change in force detected by the system is due to the sample binding to the cantilever. While both Furcht and these embodiments of the invention disclose methods of using a force transducing sensor such as a cantilever with biological samples, the forces measured by the sensor are different, as are the characteristics of the sample determined by the force measurement.

Claim 1 includes a detector that allows a measureable characteristic of the motile sample to be determined through analysis of the dynamic interaction of the force transducing sensor with said motile sample. Furcht does not disclose the use of the invention to allow

information about the samples to be determined through the interaction between the sample and the cantilever in the same way as the present invention. While the term “characteristic” is used in claim 17 of Furcht, the specification discloses only the detection of particular genetic material through binding to a particular analyte on the cantilever surface, resulting in the display of a positive or negative result. (Furcht, column 6, line 62 through column 7, line 4). Thus, the invention in Furcht functions only to determine the presence or absence of particular genetic material. Here, the invention is directed at being able to detect measureable data and provide information beyond whether a specific component is absent or present in the sample being tested. The invention in Furcht is designed to detect the binding event, which would indicate that the desired DNA or RNA fragments were present in the sample. It does not determine any measureable characteristics of the DNA or RNA fragments through their interaction with the cantilever. Applicants assert that Claim 1 is in condition for allowance over Furcht. Claims 2 – 5 and 8 depend on Claim 1 and are also in condition for allowance.

Claim 13 includes a motion detector that is capable of determining the residence times of the samples on the force transducing sensor surface coatings. The Furcht reference teaches a method of using motion caused by the interaction of genetic material in the sample with the surface coating of a cantilever to detect whether the desired DNA or RNA is present in the sample. (Furcht, column 6, line 62 through column 7, line 4). Furcht does not disclose the use of a cantilever to determine residence times of samples on a sensor, as the purpose of the invention disclosed in Furcht is only to detect particular genetic material and does not look beyond the “binding event” caused when the genetic material binds to the surface of the cantilever. Applicants assert that Claim 13 is in condition for allowance over Furcht. Claims 14 – 18 depend on Claim 13 and are also in condition for allowance.

Claim 26 describes a method for determining measureable characteristics of a motile sample. In order to accurately determine the measureable characteristics, Claim 26 requires that the samples be directed at the surface of the sensor at an angle substantially orthogonal to the surface. It is not necessary for the samples in Furcht to be directed at the cantilever in any particular angle. The system in Furcht is detecting whether a binding event occurs, not

making measurements that depend on the angle of the force of the interaction between the sample and the sensor. In claim 26, the measureable characteristics of the sample are detected through the interaction between the sensor and the sample, not through the presence or absence of any interaction at all, as in the Furcht reference. Applicants assert that Claim 26 is in condition for allowance over Furcht.

The Examiner rejected claim 26 as being anticipated under §102(b) by Thundat '717. Thundat '717 is directed at providing a cantilever with a surface coating that will react with one or more of the components of a given sample. The invention in Thundat '717 is directed at detecting and quantifying the presence of some material in a sample, rather than trying to determine characteristics of that material through its interaction with the sensor. (Thundat '717, column 2, lines 18-36). Thundat '717 does not disclose the limitation of directing the samples toward the surface of the cantilever at an angle substantially orthogonal to the surface. The method of detection in Thundat '717 does not require that the sample come in contact with the cantilever at any particular angle. Even where applied to living cells (Thundat '717, Example 2), the method disclosed serves to detect the presence of a living cell in a sample. For the methods of detection disclosed in Thundat '717, any interaction between the coating on the cantilever and the material in the sample will achieve the desired result. Control over the angle at which the cantilever is contacted is not necessary to take an accurate measurement of whether some substance is present in the sample. The method disclosed in claim 26 measures measureable characteristics of a sample, not the mere presence or absence of the sample. In order to properly determine measureable characteristics of the sample from measurements of its movement, the angle of interaction between the surface of the force transducing sensor and the sample must be known and controlled. As Thundat '717 does not disclose all limitations of Claim 26, Applicants assert that Claim 26 is in condition for allowance over Thundat '717.

The Examiner rejected Claims 1 – 5, 7, 8, 13 – 18, and 21 – 25 as being anticipated under §102(e) by Welland. As discussed in paragraphs [0001] and [0005] – [0007] of the reference, Welland discloses a method of detecting components in a sample that utilizes a cantilever to detect interaction between the molecules in the sample and a surface coating on the cantilever. Claim 1 includes a detector that allows a measureable characteristic of

the motile sample to be determined through analysis of the dynamic interaction of the force transducing sensor with said motile sample. Welland does not disclose, nor is it necessarily designed to allow information about measureable characteristics of the samples to be determined through the interaction of the sample and the cantilever. The invention in Welland functions only to determine the presence, absence, or quantity of molecules, not measureable characteristics of those molecules. Claim 1 is in condition for allowance over Welland. Claims 2 – 5, 7 and 8 depend on Claim 1 and are also in condition for allowance.

Claim 13 includes a motion detector that is capable of determining the residence times of the samples on the force transducing sensor surface coatings. As discussed in paragraphs [0001] and [0005] – [0007] of Welland, the Welland reference teaches a method of using motion caused by the interaction of molecules in the sample with the surface coating of a cantilever to detect whether such molecules are present in the sample and in what quantities. Welland does not disclose the use of a cantilever to determine residence times of samples on a sensor. Applicants assert that Claim 13 should be allowable over Welland. Claims 14 – 18 depend on Claim 13 and should also be allowable.

Claims 21 – 25 describe a method for determining the characteristic motile frequency of a multiplicity of motile samples. As discussed in paragraphs [0001] and [0005] – [0007] of Welland, the Welland reference teaches a method of using motion caused by the interaction of molecules in the sample with the surface coating of a cantilever to detect whether such molecules are present in the sample and in what quantities. The configuration in Welland is designed for detection of the presence of molecules in a sample and is distinct from the configuration in this embodiment of the invention. Applicants assert that Claim 21 is in condition for allowance over Welland. Claims 22 – 25 depend on Claim 21 and are also in condition for allowance.

For these reasons, and based on the amendments to the claims, Applicants respectfully request that the 35 U.S.C. §102 rejections be withdrawn from the application.

35 USC §103(a)

The Examiner also rejected Claims 1 – 8 and 12 - 25 as obvious under §103(a) over Thundat '717 in view of Thundat '686. Independent Claims 1, 13, and 21 all contain limitations not suggested by any combination of the Thundat references.

Claim 1 includes a detector that allows a measureable characteristic of the motile sample to be determined through analysis of the dynamic interaction of the force transducing sensor with said motile sample. The devices disclosed in the Thundat references are directed at detecting and quantifying material in a sample. Thundat '717 does mention detecting a living cell and Thundat '686 discloses detecting changes in hydrogen ion concentration to detect the presence of a living organism. Neither reference, nor the combination of the two suggests that the invention may be used to detecting the motion of a sample through dynamic interaction of the force transducing sensor with the sample whereby a measureable characteristic of the sample can be deduced. Applicants assert that Claim 1 should thus be allowable over Thundat. Claims 2 – 5 and 8 depend on Claim 1 and should also be allowable.

Applicants assert that Claim 1 is in condition for allowance over Thundat '717 in view of Thundat '686. Claims 2 – 8, 12 and 20 depend on Claim 1 and are also in condition for allowance.

Claim 13 includes a motion detector that is capable of determining the residence times of the samples on the force transducing sensor surface coatings. The devices disclosed in the Thundat references are directed at detecting and quantifying material in a sample. Thundat '717 does mention detecting a living cell and Thundat '686 discloses detecting changes in hydrogen ion concentration to detect the presence of a living organism. Neither reference, nor the combination of the two suggests that the invention may be used to determine the residence times of samples on a sensor. Applicants assert that Claim 13 is in condition for allowance over Thundat '717 in view of Thundat '686. Claims 14 – 19 depend on Claim 13 and are also in condition for allowance.

Claims 21 – 25 describe a method for determining the characteristic motile frequency of a multiplicity of motile samples. The devices disclosed in the Thundat references are directed at detecting and quantifying material in a sample. Thundat '717 does mention

detecting a living cell and Thundat '686 discloses detecting changes in hydrogen ion concentration to detect the presence of a living organism. Neither reference, nor the combination of the two suggests that the invention may be used to determine the characteristic motile frequency of motile samples. While both may be capable of detecting the presence of motile cells, mere detection and determination of the characteristic motile frequency of those cells are distinct inventions. Applicants assert that Claim 21 is in condition for allowance over Thundat '717 in view of Thundat '686. Claims 22 – 25 depend on Claim 21 and are also in condition for allowance.

The Examiner rejected Claim 11 as obvious under §103(a) over Furcht in view of Polla. The Examiner points out that Polla discloses a plurality of microcantilevers that in one embodiment form a ribbon structure. While Furcht and Polla both disclose uses of microcantilevers, the combination of the ribbon structure in Polla with the Furcht reference does not make the embodiment of the invention in Claim 11 obvious. As discussed in the response to the Examiner's rejection of Claims as being anticipated by Furcht, the Furcht reference discloses a genetic testing system that uses a cantilever to detect the presence or absence of a specific analyte or specific DNA product, but not measureable characteristics of an analyte or DNA product. Claim 1, on which Claim 11 depends, contains a limitation that the invention comprise a detector that allows a measureable characteristic of the motile sample to be determined through analysis of the dynamic interaction of the force transducing sensor with said motile sample. This detection of a measureable characteristic goes beyond the presence or absence of a particular sample disclosed by Furcht or Polla. Applicants assert that as Furcht does not disclose the motion sensor set forth in Claim 1, Claim 11 is not obvious when Furcht is combined with Polla. Applicants further assert that Claim 11 is in condition for allowance over Furcht in view of Polla.

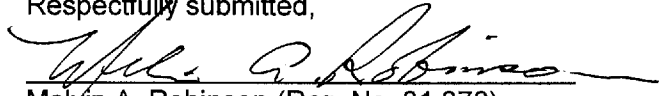
The Examiner rejected Claims 27 - 32 as obvious under §103(a) over Welland in view of Paritsky. Claims 27-32 have been cancelled.

Conclusion

Inasmuch as each of the objections have been overcome by the amendments and discussion above, and all of the Examiner's suggestions and requirements have been satisfied, it is respectfully requested that the present application be reconsidered, the rejections be withdrawn and that a timely Notice of Allowance be issued in this case.

Any shortages of fees due may be charged to, and any overpayments may be credited to, deposit account no. 50-1519.

Respectfully submitted,



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